

## 04/16/14 Agenda

- Fill in rest of Factoring Organizer
- Station Review

## Homework - **STUDY!!!!!!**

- Review Packet
  - It will be collected before the test tomorrow

**IMPORTANT: \*\*Always look to factor the GCF of all terms first\*\***

# OF TERMS	FACTORIZING TECHNIQUE		EXAMPLE
2 or more	Greatest Common Factor (of all terms) "Reverse Distribution" → Divide out GCF, so GCF( + )		$3x^3 + 6x^2 - 15x = 3x(x^2 + 2x - 5)$
4 or more	Factoring by Grouping Parentheses or "Box Method"	$ax + bx + ay + by$ $= x(a + b) + y(a + b)$ $= (a + b)(x + y)$	$(3xy - 6y) - (5x + 10)$ $3y(x - 2) - 5(x - 2)$ $(3y - 5)(x - 2)$
2	Difference of Squares	$a^2 - b^2 = (a + b)(a - b)$ [Take square roots]	$\sqrt{4x} = 2x$ $\sqrt{25} = 5$ $4x^2 - 25 = (2x + 5)(2x - 5)$
3	$x^2 + bx + c$ "ac 7 b-Method"	$x^2 + bx + c = (x + m)(x + n)$ , when $m + n = b$ and $mn = c$ [factors of c]	$x^2 - 9x + 20 =$ $(x - 4)(x - 5)$ $\begin{array}{r} 1 \cdot 20 = 20 \\ -1, -20 \\ -2, -10 \\ -4, -5 \end{array}$
3	$ax^2 + bx + c$ "ac 7 b-method" then grouping (or GCF shortcut)	$ax^2 + bx + c = ax^2 + mx + nx + c$ , where $mn = ac$ and $m + n = b$ . Then use factoring by grouping.	$6x^2 - x - 2 =$ $(6x - 4)(x + 3)$ $\begin{array}{r} 6 \cdot -2 = -12 \\ -1, 12 \\ -4, 3 \end{array}$ $(3x - 2)(2x + 1)$
3	Perfect Square Trinomial	$a^2 + 2ab + b^2 = (a + b)^2$ $a^2 - 2ab + b^2 = (a - b)^2$	$x^2 + 6x + 9 = (x + 3)^2$ $4x^2 - 4x + 1 = (2x - 1)^2$

Graphic Organizers used to factor...

Box Method (Grouping – 4 terms)

$$3xy - 6y - 5x + 10$$

- Factor out GCF in each row and column
- Take out (-) if top of column or left of row

	x	-2
3y	3xy	-6y
-5	-5x	+10

7-Method (Trinomials): Always factor out GCF first, if able

[a = 1 Easy]

$$x^2 - 9x + 20 = (x - 4)(x - 5)$$

$$a = 1 \quad b = -9 \quad c = +20$$

$$ac = 20$$

$$\begin{array}{l} -5, -4 \\ \hline b = -9 \end{array}$$

$$(1)(20) = 20 \text{ [ac]}$$

$$(-5) + (-4) = -9 \text{ [b]}$$

[a ≠ 1 Harder "Shortcut"]

$$6x^2 - x - 2 = (6x - 4)(6x + 3)$$

"ax"                      "ax"

$$ac = -12$$

$$\begin{array}{l} -4, 3 \\ \hline b = -1 \end{array}$$

Divide by GCF

$$\frac{(6x-4)(6x+3)}{6 \cdot 2 \cdot 3}$$

$$(3x-2)(2x+1)$$

$$(6)(-2) = -12 \text{ [ac]}$$

$$(-4) + (3) = -1 \text{ [b]}$$

Steps to solve for x when polynomial = 0

- Move all terms to one side of equation.
- Factor out the GCF (if there is one).
- Factor using any other applicable techniques
  - i.e.  $(x + m)(x + n) = 0$
- Use **zero product property** so  $x + m = 0$  and  $x + n = 0$
- Solve for x:  $x = -m$  and  $x = -n$

Example:  $x^2 + 80 = 18x$

**Target 8A**

- Simplify polynomials by addition, subtraction, or multiplication.

$$(-8x - 10x^3 - 2x^4) + (x^2 + 10x + 4x^3)$$

$$10x(6x + 4)$$

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**Target 8B**

- Simplify multiplication of polynomials using double distribution (FOIL).

$$(x - 10)(2x - 7)$$

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**Target 8C**

- Factor a polynomial using GCF's.

$$30x^4 + 54x^3 + 60x$$

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**Target 8D** - Factor a trinomial.

$$x^2 + 12x + 35$$

$$21x^2 + 87x + 72$$

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**Target 8E** - Factor special cases.

$$x^2 - 36$$

$$9x^2 - 25$$

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**Target 8F** - Factor by grouping.

$$x^3 - 3x^2 + 3x - 9$$

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### Steps to Factoring Completely:

- 1.) Factor out the *Greatest Common Factor (GCF)*.
- 2.) If the polynomial has 2 or 3 terms, look for a difference of two squares, or a pair of binomial factors
- 3.) If the polynomial has 4 or more terms, group terms and factor to find common binomial factors.
- 4.) As a final check, make sure there are no common factors other than 1.